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van der Lecq, S.G.; Steenbeek, O.W.; Rivera Rozo, J.A.; García Huitrón, M.E.

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National culture and the configuration of public pensions☆

J.A. (Jairo) Rivera-Rozo[a], M.E. (Manuel) García-Huitrón[b], O.W. (Onno) Steenbeek[c,*], S.G. (Fieke) van der Lecq[d]

[a] De Nederlandsche Bank and Erasmus School of Economics, P.O. Box 98, 1000 AB Amsterdam, The Netherlands
[b] Inter-American Development Bank, 1300 New York Avenue N.W, Washington DC 20005, United States
[c] APG and Erasmus School of Economics, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands
[d] Vrije Universiteit Amsterdam, FEWEB, office 6A-59, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands

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ABSTRACT

Rivera-Rozo, J.A. (Jairo), García-Huitrón, M.E. (Manuel), Steenbeek, O.W. (Onno), and van der Lecq, S.G. (Fieke)—National culture and the configuration of public pensions

This paper explores the determinants of public pension plan configurations. It is argued that the level of intragenerational redistribution in public pension plans is related to a country's cultural background. The level of intragenerational redistribution is measured by Krieger and Traub's Bismarckian factor. The countries' cultural background is operationalized using cultural dimensions developed by Hofstede. The empirical results are in line with our hypotheses. Uncertainty avoidance appears to have a significant, positive association with the Bismarckian factor (low intragenerational redistribution in public pensions), whereas the relation with individualism is negative (high intragenerational redistribution). Moreover, a positive association is found between the Bismarckian factor and inflation shocks in the first half of the 20th century. While the sample size is limited, the results are robust to the inclusion of different economic, institutional, and demographic control variables as well as to using alternative model specifications. These findings have important public policy implications. We argue that pension reform proposals suggesting a transformation of public to private pension provision should consider the cultural background of countries. *Journal of Comparative Economics* **46** (2018) 457–479. De Nederlandsche Bank and Erasmus School of Economics, P.O. Box 98, 1000 AB Amsterdam, The Netherlands; Inter-American Development Bank, 1300 New York Avenue N.W, Washington DC 20005, United States; APG and Erasmus School of Economics, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands; Vrije Universiteit Amsterdam, FEWEB, office 6A-59, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands.

1. Introduction

The structure of public pensions[1] is one of the most important features of pension systems. We distinguish two main types of public pension systems based on their level of intragenerational redistribution. On the one hand, Bismarckian public

☆ The views expressed in this paper are those of the authors and do not necessarily reflect those of the institutions they are affiliated to.

* Corresponding author at: Erasmus School of Economics, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands.
E-mail addresses: j.a.rivera.rozo@dnb.nl (J.A. Rivera-Rozo), manuelga@iadb.org (M.E. García-Huitrón), steenbeek@ese.eur.nl (O.W. Steenbeek), s.g.vander.lecq@vu.nl (S.G. van der Lecq).

[1] By public pensions we followed the OECD definition: "social security and similar statutory programs administered by the general government (that is central, state, and local governments, as well as other public sector bodies such as social security institutions)" (OECD, 2011).

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pension plans have as their main goal the smoothing of income over the lifecycle. In these plans, which are mostly organized as earning-related schemes, pension benefits have a close link with individuals' lifetime earnings. As a result, Bismarckian plans have lower levels of income redistribution across individuals. On the other hand, Beveridgean public pension plans mainly focus on guaranteeing a high enough minimum pension income to all individuals, irrespective of their earnings history. These schemes focus on intragenerational redistribution of income in old age, so that low-income individuals obtain higher replacement rates.

The central question in this paper concerns the determinants of cross-country variations in the configurations of public pensions. The most common way to respond to the differences in the configurations of public pensions has thus far been to employ political economy models (e.g., Galasso and Profeta, 2002). This strand of research argues that the choice of social security system is the result of a political process in which different agents and groups of the population intervene to protect their own interests. For instance, it has been shown that higher levels of inequality in income distribution are related to Beveridge-like public pension programs (Conde-Ruiz and Profeta, 2007). Moreover, high levels of inflation resulted in a negative attitude toward financial markets that subsequently determined the main mode of pension system organization, that is, pay as you go (PAYG) versus funding (Perotti and Schwienbacher, 2009).

Another way to analyze the choice of public pension programs is by studying the differences in redistribution preferences in a society. Put differently, if certain characteristics in a society are related to the level of income redistribution, these same aspects would help explain the level of intragenerational redistribution of public pension plans. All in all, a greater preference for redistribution would be more supportive of Beveridgean public pension programs. It has been shown in the literature that lower levels of income redistribution are related to countries with more racial fractionalization (Alesina et al., 2003), more conservative political views (Esarey et al., 2012), and older populations (Bellemare et al., 2008).

Esping-Andersen (1990) and Queisser et al. (2007) argue that the choice that countries made in the past between Bismarckian and Beveridgean public pensions has largely determined the importance of private pension provision. In countries that implemented a configuration of public pensions based on the Bismarckian tradition, where pension benefits reflect lifetime earnings with high replacement rates, private pensions had limited room for development. On the other hand, in countries that followed a Beveridge-like approach to public pensions, with high redistribution and low replacement rates, private pension provision has had the opportunity to grow and therefore constitutes an important complement to government-run social security programs (Rivera-Rozo et al., 2014).

We believe that a better understanding of new possible factors determining cross-national differences in public pension configurations is of great importance in the fields of pensions and social security studies. This paper fills this gap in the literature as it investigates the role of national culture on a country's preferences for redistribution in public pension schemes. Hofstede defines culture as the set of values and beliefs that are broadly shared in a society and that differentiate one group of individuals from another. For our purpose, we use Hofstede's (2001) dimensions to capture cross-cultural differences: power distance, masculinity-femininity, individualism-collectivism, and uncertainty avoidance.[2] Specifically, we posit that countries with high levels of power distance, masculinity-femininity,[3] and uncertainty avoidance will have lower levels of intragenerational redistribution of public pensions. The opposite relationship is conjectured for individualism-collectivism.[4]

The paper makes two contributions to the literature on social security and pension systems. First, we document that the cultural dimensions of power distance and uncertainty avoidance help explain cross-country differences in the levels of income redistribution of public pension plans. Uncertainty avoidance appears to have a significant, positive association with the Bismarckian factor (low intragenerational redistribution in public pensions), whereas the relationship with individualism is negative (high intragenerational redistribution). The results are robust to (1) different control variables, (2) an alternative measure of the configuration of public pensions[5] and an updated version of Hofstede's cultural dimensions, as well as (3) an instrumental variables approach.

Second, our findings complement the work of Perotti and Schwienbacher (2009) and Aggarwal and Goodell (2012). We argue that since our focus is on public pension configurations, our results shed new light on the reason why some countries have large amounts of private pension funding, while other societies are more dependent on PAYG pension schemes. Moreover, our findings represent an opportunity to compare how the associations of national culture with pension redistribution differ between the public and private sectors.

Our findings have important public policy implications. The issue of pension reform remains high on government agendas as an attempt to curb the impact of population aging and rising life expectancies on fiscal budgets (Lindbeck and Persson, 2003). One way to tackle this issue is by making a transition from public earning-related pension schemes to private plans (Börsch-Supan, 2012). We argue that such a transformation of public to private pension provision should be evaluated considering a country's specific cultural background and history. For instance, countries with high uncertainty avoidance, where there is opposition to financial systems and the risks they involve, seem to prefer public pensions with high replacement rates, since this would limit the necessity of additional private pension provision and therefore curtail the role of finan-

[2] These cultural dimensions will be defined in Section 2.

[3] In the remainder of the paper this cultural dimension will be referred to as masculinity.

[4] in the remainder of the paper this cultural dimension will be referred to as individualism.

[5] The results are also robust to an alternative measure of pension progressivity that also encompasses the design of the second pillar. This was the main measure used by Aggarwal and Goodell (2012).

cial markets in the pension system. Hence, in countries with high uncertainty avoidance, a proposal for pension reforms that would remove Bismarckian public pensions is likely to face public resistance. For example, there were massive protests against pension reforms in France in 2010 and in Spain in 2013. In some countries, such reforms were even reversed, for example, Argentina, Poland, and Hungary. These three countries have high scores in uncertainty avoidance and have in common that their pension systems were structurally reformed in the 1990s from PAYG-financed public pensions to funded systems. These reforms have been (partially) reversed since the global financial crisis of 2008–2009.

The remainder of the paper is organized as follows. Section 2 reviews the literature on the development of public pensions and theories explaining the differences in their configurations. Section 3 describes the variables used in the analysis, as well as the development of testable hypotheses. Section 4 discusses the empirical results and Section 5 concludes the study.

2. Configuration of public pensions: literature review

Public pension systems have been classified in the literature as either Bismarckian or Beveridgean. Bismarckian public pension systems, so named after Otto van Bismarck,[6] focus mainly on the redistribution of income across the lifecycle. These plans are organized on an earnings-related basis, with a high degree of actuarial fairness (i.e., benefits after retirement are closely linked to contributions paid during active working life) and are financed through employer and employee contributions. Finally, in Bismarckian systems private pensions are less common, which can be interpreted as public pensions crowding out private provision in these regimes (Disney, 2000, 2004). On the other hand, Beveridgean systems, so named after Sir William Beveridge,[7] have as their main objective the provision of a minimum level of pension income for all individuals, regardless of their earnings or work history. These systems, which have high levels of intragenerational income redistribution, are financed via general taxation. Benefits are usually based upon the number of years of residence in a country (Queisser et al., 2007).

Beveridgean and Bismarckian systems differ in several aspects. Conde-Ruiz and Profeta (2007) report that income inequality is higher in Beveridgean countries. Moreover, low-income individuals receive higher replacement rates in Beveridgean systems. In addition, Beveridgean countries are associated with lower public pension expenditures as a percentage of the gross domestic product (GDP). Disney (2004) also provides evidence showing that Bismarckian systems have higher contribution rates than Beveridgean systems. Furthermore, the author calculates for 22 OECD countries the share of public pension contributions that is used for income redistribution and reports, as expected, that this share, called the tax component of contributions, is lower in Bismarckian systems. One could interpret these findings as follows: Although the intragenerational redistribution of public pensions is greater in Beveridgean systems, the small size of these systems—the result of lower pension contributions—does not reduce the overall level of income inequality. As a result, this inequality is higher in Beveridgean countries. Finally, it is important to mention that neither pure Bismarckian nor pure Beveridgean systems exist. All public pension systems have a mix of lifetime and intragenerational redistribution (Queisser et al., 2007).

2.1. Explaining the configuration of public pensions

Two main streams of literature explain the differences in the configurations of public pensions. The first follows political economy models and the second focuses on preferences for redistribution.

2.1.1. Political economy models

According to political economy models, the implementation and size of social security is mainly tied to demographic developments in societies. Different groups of individuals, in terms of age and income, compete in the political arena to determine the policy outcome. Majority voting, veto power, and interest group models are some of the mechanisms used in the political economy literature to investigate social security. A common feature of this stream of literature is that it concentrates on the aggregate size of social security but neglects other differences, such as in the degree of intragenerational redistribution.

Conde-Ruiz and Profeta (2007) show that income inequality is a key determinant of social security design. In countries with wide differences in income distribution, low- and high-income individuals would form a voting coalition that favored a small, Beveridge-like public pension program. In this social security system, all individuals would receive a minimum pension but private provision would still be necessary. As a result, both groups of individuals would get what they prefer:

[6] Germany introduced its social security system in 1889, under Otto van Bismarck. This system consisted of mandatory PAYG pension plans run by the government and financed by employer and employee contributions. Pension benefits started at the age of 65 but were stopped after reaching the pension age of 70 years, an age that was significantly beyond the life expectancy of most workers (Lindert, 1994). Contrary to the common view that links social security with left-wing politics, Bismarck's pension system was implemented to cut the advancement of socialism in society. Thus, this system did not entail any form of income redistribution but, instead, tried to promote the preservation of differences across social classes (Esping-Andersen, 1990).

[7] In the literature, pension programs with a high level of explicit intragenerational redistribution are labeled Beveridgean. However, when Sir William Beveridge developed public social insurance in the United Kingdom in 1911, the program was based on flat benefits and flat contributions, thus without income redistribution. Later, countries that had initially adopted the Beveridgean tradition, including the United Kingdom, moved away from its original features. Although these systems did not have entitlements that were wholly dependent on contributions, but just the opposite, the Beveridgean label remained unchanged.

redistribution for low-income individuals and a cheap social security plan for the better off. In contrast, in countries with a more equal distribution of income, the middle class would be the majority in the political process. This group is likely to choose a large, Bismarck-like social security system. Since there is no urgent need for income redistribution, social security would concentrate on providing a retirement savings vehicle for individuals.

2.1.2. Preferences for redistribution and public pensions

An alternative approach to the political economy models is the analysis of preferences for redistribution. It can be argued that the distinction between Bismarck-like and Beveridge-like public pensions boils down to the question of what are the society's preferences toward redistribution. Corneo and Grüner (2002) argue that the financial outcomes of public policy are not the only determinants of personal attitudes toward government redistribution, but that the values and beliefs held by individuals also play a role. A high income, for example, may be the consequence of either an individual's inheritance or hard work. Alesina and Giuliano (2010a) provide a thorough review of the determinants of preferences for redistribution. Their results suggest that for the United States, preferences for redistribution are related to personal attributes. More specifically, black people, women, and low-educated and young people are more pro redistribution. Moreover, a religious upbringing, regardless of belief, makes people favor redistribution. Finally, it is also observed that individuals born outside of the United States exhibit preferences for redistribution that resemble those of their countries of origin.

As for redistribution in pensions, Tausch et al. (2013) review the experimental literature on social preferences. The literature shows that individuals are more supportive of redistribution in pensions when the sources of inequality are perceived to be beyond a person's control. Furthermore, it is observed that people show less preference for redistribution when they perceive that the recipients of the transfers belong to a different group (larger social distance between those who give and those who receive).

2.2. National culture and pension systems

Hofstede's (2001) book *Cultures' Consequences* has arguably provided the predominant framework for introducing culture to financial and economic research (Reuter, 2011) and management studies (Kirkman et al., 2006). Hofstede's work is based on four dimensions[8] that aim to measure fundamental aspects of a society relative to other societies: (1) power distance (PDI) captures how societies deal with social inequality and the relationship with authority (2) individualism-collectivism (IND) refers to the relationship between the individual and the group; (3) masculinity-femininity (MAS) is concerned with the emotional roles attached to men and women in society; and (4) uncertainty avoidance (UAI) refers to the ways societies deal with uncertainty and ambiguity in life.

Several studies have looked at the relation between culture and pensions, using Hofstede's framework of cultural dimensions in most cases. Hempel (1998) investigates how cultural differences shape the benefits programs of companies with multinational operations. Among multiple findings, the author claims that separate pension plans for different types of employees (e.g., white versus blue collar) would not be acceptable in countries with low power distance. This is because in such countries special treatment of different groups is not accepted. Cravens and Oliver (2000) find that culture, measured by distinguishing five clusters of countries (i.e., Anglo, Latin, Germanic, Asian, and Nordic), influences the provision of private pension benefits. According to the authors' results, employers in Asian countries make higher contributions to pension funds than employers in any of the other clusters of countries.

More recently, Perotti and Schwienbacher (2009) and Aggarwal and Goodell (2012) have also investigated other characteristics of national pension systems using elements of national culture as plausible explanatory factors. Perotti and Schwienbacher (2009) study the factors explaining cross-country differences in private pension funding. They use as a dependent variable the size of pension fund assets as a percentage of GDP and find that large wealth redistribution shocks, produced by hyperinflation and losses in financial markets during the Great Depression, are associated with lower private pension funding. Their results are robust to the addition of several control variables, including Hofstede's uncertainty avoidance, which does not have a significant relationship with private pension funding. Aggarwal and Goodell (2012) focus on explaining international differences in pension progressivity. Their measure of progressivity, which is taken from the OECD (2011), indicates to what extent pension benefits (from both mandatory public and private plans) reflect lifetime earnings. Among other variables, Aggarwal and Goodell (2012) find that pension progressivity is negatively related to masculinity, uncertainty avoidance, and individualism.

We expand on this research by concentrating on the structure of *public* pension systems, since we claim that the structure of these systems and their redistributive character has determined the development of pension systems as a whole.

3. Hypotheses and methodology

This section discusses different factors that have been suggested in the literature as plausible explanations of cross-country differences in the configurations of public pensions. The section begins by describing how the dependent variable

[8] A cultural dimension is the operationalization of a society's values and preferences with respect to specific aspects of life, for example, the distribution of power, and the way that societies are structured. A country's score in a particular dimension does not provide an absolute position in a ranking. Instead, it informs us on the country's attitudes toward a specific aspect of life relative to those of other societies.

Table 1
Bismarckian factor averages, 1988–2008.

Country	Mean	Country	Mean
Australia	0.050	Italy	0.531
Austria	0.513	Luxembourg	0.344
Belgium	0.460	Mexico	0.506
Canada	0.239	Netherlands	0.307
Czech Republic[a]	0.150	Norway	0.330
Denmark	0.025	Poland	0.417
Finland	0.348	Slovenia[b]	0.499
France	0.723	Spain	0.496
Germany	0.563	Sweden	0.496
Greece	0.638	Switzerland	0.108
Hungary	0.298	United Kingdom	0.127
Ireland	0.341	United States	0.489
Israel	0.094		

[a] Data available for Czechoslovakia (1988–1992) and the Czech Republic (1993–1997 and 2003–2004).
[b] Data available for Slovenia (1992–2004).

in the empirical analysis is determined. Thereafter, the conjectured relationships between the independent variables and the dependent variable are presented.

3.1. Dependent variable: the Bismarckian factor

In public pensions, there is a range of different mixes of redistribution between rich and poor and lifecycle redistribution (Queisser et al., 2007). Several approaches have been developed to measure the degree of redistribution of public pensions: survey panels on pension benefits and pre-retirement earnings (Conde-Ruiz and Profeta, 2007; Krieger and Traub, 2013), institutional analyses of pension systems, and microeconomic projections of pension entitlements (Disney and Johnson, 2001; Disney, 2004; OECD, 2011).[9]

Krieger and Traub (2008, 2011, 2013) developed a measure of the level of intragenerational redistribution in public pensions called the Bismarckian factor. This is an index that compares the inequality of pension benefits with the inequality of household net income.[10] The Bismarckian factor is based on micro data from the Luxembourg Income Study (LIS). The LIS reports household net income and pension benefits derived from employment and non-employment-related public pensions. The data are organized in waves that correspond to periods of around five years.[11] It is important to bear in mind that the LIS database uses different samples for each wave, which means that a relation between an individual's previous earnings and present pension benefits cannot be made. Thus, the calculations are carried out for aggregate groups that match the quintiles of income distributions.[12]

Table 1 lists the mean national Bismarckian factor, averaged for 1988–2008.[13,14] The Bismarckian factor has a score between zero and one. A purely Beveridgean system will yield a Bismarckian factor equal to zero, whereas in a purely Bismarckian system the Bismarckian factor has a value of one. Appendix A presents a more detailed description of how the Bismarckian factor is derived and calculated. Table 1 shows that no public pension configuration is completely Bismarckian or Beveridgean and that these two types of plans are the extremes in a spectrum of possible configurations. Some countries have very redistributive public pension plans (e.g., Australia and Denmark), whereas in others the opposite is true (e.g., France and Greece).

[9] The OECD (2011) Pensions at a Glance report includes a progressivity index of the pension benefit equations based on microeconomic projections. A characteristic of this index is that it covers *all* mandatory pension plans in a system, both public and private. This is the index used by Aggarwal and Goodell (2012).

[10] Appendix A presents a more detailed description of how the Bismarckian factor is derived and calculated.

[11] The data from the LIS are available in five waves: 1988–1992, 1993–1997, 1998–2002, 2003–2004, and 2006–2008.

[12] A necessary assumption is that shifts in income and pension benefit positions will not occur within two consecutive generations.

[13] It is worth mentioning that for the sake of the readability of the regression results, in the empirical analysis the Bismarckian factor has been multiplied by a factor of 100. For example, Australia has a Bismarckian factor of 0.050 but the value used for the OLS regressions is five.

[14] Data are not available for all countries for the period 1988–2008. These are the LIS waves available per country: Australia (1988–2004), Austria (1993–2002), Belgium (1988–2002), Canada (1988–2008), Czechoslovakia (1988–1992), the Czech Republic (1993–1997 and 2003–2004), Denmark (1993–2004), France (1988–2004), Finland (1988–2004), Germany (1988–2008), Greece (2006–2008), Hungary (1988–2004), Ireland (1993–2004), Israel (1988–2008), Italy (1988–2008), Luxembourg (1988–2002), Mexico (1988–1992), the Netherlands (1988–2002), Norway (1988–1997), Poland (1988–2004), Slovenia (1992–2004), Spain (1988–2002 and 2006–2008), Sweden (1988–1997), Switzerland (1988–1992 and 1998–2004), the United Kingdom (1988–2008), and the United States (1988–2008).

3.2. Independent variables and hypotheses

In this paper, Hofstede's (2001) cultural dimensions are used to explain the differences in the structure of public pension plans.

3.2.1. Power distance

Power distance (PDI) refers to the extent to which a society accepts that power is distributed unequally. A characteristic of societies with high power distance scores is that individuals in powerful positions tend to see individuals without power as not belonging to their group. Tausch et al. (2013) find that when these instances of social distance arise, people are less inclined toward redistribution, which would imply the implementation of a more Bismarck-like social security program. Moreover, Corneo and Grüner (2000, 2002) report that a low preference for redistribution is found among individuals concerned with maintaining their social status. Since larger social distances and a concern with status are features that match the profile of societies with higher scores in power distance, we would expect a positive association between power distance and the Bismarckian factor.

3.2.2. Individualism

Individualism (IND) measures the extent to which individuals are supposed to look after themselves or be associated in groups. Freedom in the workplace is regarded as more important by employees surveyed in individualist countries. On the contrary, employees in collectivist societies tend not to attach relevance to freedom and autonomy at work (Hofstede et al., 2010). Regarding the analysis of pension systems, one could expect that in individualistic countries it would be preferable to have more freedom in the way pension decisions are made, which is arguably more likely to be possible in pension systems with private provision. Since private pension provision is a characteristic of Beveridgean systems, individualism would be expected to be negatively associated with the Bismarckian factor. Furthermore, Galasso and Profeta (2011) argue that in societies with weak family ties (e.g., Anglos-Saxon countries) a Beveridge-like social security system emerged to act as a safety net. In contrast, in societies with strong family ties, individuals preferred to rely on the state as the provider of old age security via Bismarckian schemes with generous benefits. Since strong family ties are negatively correlated with scores in individualism (Alesina and Giuliano, 2010b; Letendre et al., 2010), these findings would suggest a negative association between high scores in individualism and the Bismarckian factor.

On the other hand, Chui and Kwok (2008) suggest that individuals in societies with high scores in individualism are less in favor of public support systems (e.g., Beveridge-like programs) than those in collectivistic countries. This is because in individualistic countries individuals prefer to take care of their own fate and that of their nuclear family. In these countries, being a recipient of public benefits is typically seen as a sign of weakness. This would imply that individualism not only limits the giving to others, but also the receiving from others. Finally, Aggarwal and Goodell (2012), based on the above-mentioned rationale, find evidence for the negative association between individualism and the progressivity of total pension benefits, thus from both public and private plans.

All in all, there are arguments supporting both a positive and a negative relationship between individualism and the Bismarckian factor. The empirical analysis will have to determine which argument prevails.

3.2.3. Masculinity

Masculinity (MAS) measures to what extent a society prefers, on the one hand, masculine values— such as assertiveness and competitiveness—or, on the other hand, feminine values— such as solidarity and quality of life—. Feminine societies (with low masculinity scores) tend to focus on values such as solidarity and taking care of those in need. On the other hand, masculine societies are characterized by fighting out conflicts and placing considerable emphasis on competition, assertiveness, earnings, and recognition (Hofstede, 2001). Moreover, Tausch et al. (2013) report the results of several experiments that show that women are more generous than men. Furthermore, Alesina and Giuliano (2010a) report that women are more socially generous than men. In addition, as suggested by Aggarwal and Goodell (2012), the organization of pension provision via earnings-related schemes is congruent with a masculine view in a society that emphasizes earnings and recognition in the workplace. All in all, low masculinity scores would be associated with more Beveridge-like pension plans with intragenerational redistribution, whereas high masculinity scores would be associated with more Bismarck-like plans, in which pension benefits are more clearly related to previous earnings.

3.2.4. Uncertainty avoidance

Uncertainty avoidance (UAI) measures the degree to which individuals feel either comfortable or uncomfortable in unstructured situations. Krieger and Traub (2008) report a negative correlation between the level of intragenerational redistribution and the generosity of pension systems (replacement rate). Thus, Bismarckian pension systems have higher replacement rates than Beveridgean systems. Bearing this in mind, Aggarwal and Goodell (2012) argue that societies with high uncertainty avoidance would prefer Bismarckian earnings-related pensions because higher replacement rates would reduce the chances of a drop in consumption after retirement.

Moreover, Kwok and Tadesse (2006) find that countries with lower scores in uncertainty avoidance tend to have market-based financial systems, whereas countries with higher uncertainty avoidance are related to bank-based financial systems. An explanation of this result is that bank-based systems offer more predictable returns to investors. Following this line of

argument, we posit that countries with higher scores in uncertainty avoidance would be associated with no (or limited) private pension provision, which is a characteristic of Bismarckian pension systems. This is because state-run pension schemes are less subject to volatile financial markets, which means that they are expected to provide more predictable pension benefits.

3.3. Control variables

Besides the cultural variables, several country-specific characteristics could also be related to the level of intragenerational redistribution in public pensions. This section presents the control variables used in the empirical analysis and their expected relations with the Bismarckian factor.

3.3.1. Age

Bellemare et al. (2008) report that older people have a stronger preference for income equality. Similarly, Rehm (2005) argues that older people would be more supportive of redistribution because they are more dependent on healthcare and pension provision, which is offered by state-run programs in most countries. Moreover, older individuals support higher government spending in social security programs because of their difficulty in finding a new job later in their careers (Iversen and Soskice, 2001). However, Alesina and Giuliano (2010a) find that in the United States the relationship between age and preferences for redistribution has an inverted U shape: individuals are pro redistribution while younger and later in life they become less so. Based on these findings, we use the median age of a country as a control variable in the analysis. The data for this variable are taken from the 2005 *CIA World Factbook*. All in all, the association between the Bismarckian factor and a country's median age is not clear.

3.3.2. Ideological orientation

Esarey et al. (2012) find that individuals with liberal orientations have stronger preferences for redistribution than conservatives do. Moreover, Alesina and Giuliano (2010a) report that left-wing individuals in the United States are more pro redistribution. As expected, Iversen and Soskice (2001) find that supporters of leftist parties express greater support for social spending than supporters of rightist parties.

To measure ideological orientation, we use information from the Comparative Political Data Set III. This data set, which covers OECD countries for the period 1990–2010, contains a collection of political and institutional data. The variable Government Left reports the percentage of social democratic and other left-wing parties in total cabinet posts. For our measure of ideological orientation, we take the average of Government Left over the period from 1990 until 2005.

We control for ideological orientation and expect a negative relationship between the Bismarckian factor (lower progressivity of social security benefits) and the participation of left-wing parties in cabinet posts.

3.3.3. Ethnic fractionalization

Alesina and Glaeser (2004) investigate why the levels of intragenerational redistribution are higher in Europe than in the United States. Their empirical results suggest that half of the differences in redistribution from the rich to the poor between Europe and the United States can be explained by differences in the index of ethnic fractionalization of Alesina et al. (2003). Thus, it is found that countries with more racial fractionalization tend to be less generous to the poor. Moreover, Easterly and Levine (1997) and Luttmer (2001) also find that ethnically fragmented countries have lower levels of income redistribution. One possible explanation underlying this correlation is offered by Luttmer (2001), who argues that if individuals prefer to redistribute among those of their own racial group, then they would prefer less redistribution when their own group represents a smaller share of potential benefit recipients in society. Therefore, the more ethnically fragmented a country is, the lower the preferences for redistribution in such a society.

All in all, we use the Index of Ethnic Fractionalization of Alesina et al. (2003) as a control variable and expect it to have a positive association with the Bismarckian factor.

3.3.4. Confidence in the public sector

It could be argued that public pensions would generally receive more support from individuals when there is a higher level of confidence in the public sector and its civil servants. When this is not the case, individuals would prefer an organization based on private pension provision, which is a characteristic of Beveridge-like pension systems. This variable is taken from the World Values Survey and reflects the percentage of individuals responding that they have "a great deal" or "quite a lot" of confidence in their country's civil service. We would expect a positive association between higher levels of confidence in the public sector and the Bismarckian factor.

3.3.5. National wealth

The relationship between national wealth and the configuration of public pensions is not completely clear. On the one hand, it could be argued that richer countries would, on average, be in a financial position to provide extra support to less well-off pensioners via intragenerational transfers within the pension system. This would mean that countries with higher levels of national wealth could be able to afford a greater progressivity of pension benefits via Beveridge-like public pension plans. On the other hand, one could argue that in poorer countries, due to higher levels of informality in the labor market,

as well as tax evasion, the implementation of fully fledged public pension schemes might not be feasible. Thus, pension provision would be predominantly offered by the private sector, which would mean a Beveridgean configuration of social security. We control for the wealth of a country with purchasing power parity GDP per capita (in 2005 US dollars), obtained from the World Bank's World Development Indicators.

3.3.6. Income inequality

Conde-Ruiz and Profeta (2007) report that societies with high levels of income inequality would favor Beveridge-like social security schemes more and, thus, the greater progressivity of pension benefits. The rationale is as follows. In countries with wide differences in income distribution, low-income and high-income individuals would form a voting coalition that would choose a small Beveridge-like public pension program. In this social security system, all individuals would receive a state minimum pension but private additional provision would still be necessary. Consequently, both groups of individuals would get what they prefer: redistribution for low income individuals and a cheap social security plan for the more affluent. In contrast, in countries with a lower inequality of income distribution, the middle class would be the majority in the political process and they would choose a large Bismarck-like social security system in which pension benefits are closely linked to earnings. Thus, this reasoning would suggest a negative relationship between income inequality and the Bismarckian factor.

However, Conde-Ruiz and Profeta (2007) seem to contradict other authors' results. Perotti and Schwienbacher (2009) find a negative relationship between income inequality, measured by the Gini coefficient before the introduction of a major pension program, and current levels of pension funding relative to the GDP. Since small private pension provision is a characteristic of Bismarckian pension systems, one could expect a positive relationship between income inequality and the Bismarckian factor. Furthermore, Krieger and Traub (2008) find that increases in the variance of income distribution (higher inequality) are related to increases in the Bismarckian factor. Moreover, Aggarwal and Goodell (2012) note a negative relationship between the progressivity of pensions and income inequality.

All in all, despite the theoretical ambiguous relationship between income inequality and the Bismarckian factor, in the empirical analysis we control for income inequality using the Gini coefficient for 2005 from the 2005 *CIA World Factbook*,

3.3.7. Social trust

Aggarwal and Goodell (2012) find evidence showing that social trust is positively associated with the level of pension progressivity. The rationale of their argument is that, in societies where individuals generally think that others cannot be trusted (low social trust), individuals would use the political system to guarantee that a minimum pension is provided to everybody via the public sector. However, Bergh and Bjørnskov (2011) show that societies with higher levels of trust are able to create and sustain larger welfare state programs. The authors' rationale is that in trusting societies free-riding behavior is less pronounced. This means that fewer individuals would try to take advantage of universal access to public goods, transfers, and services. Therefore, in high-trust countries, welfare states are more likely to be financially sustainable. All in all, combining these results, we cannot make any specific conjectures about the direction of the association between social trust and the level of intragenerational redistribution in public pensions measured by the Bismarckian factor.

We control for the level of social trust in our analysis. This variable is taken from the World Values Survey and represents the percentage of individuals who responded that most people can be trusted.

3.3.8. Trade union density

Rehm (2005) notes that trade unions are meant to support policies that promote the protection of employees. One of these policies could be the redistribution of income via pension benefits. Therefore, one could expect a negative relationship between a country's trade union density and the Bismarckian factor.

We control for trade union density. This variable is taken from the OECD statistics and is calculated as the number of wage and salary earners who are trade union members, divided by the total number of wage and salary earners. The values used are the average trade union density for the period 2000–2005.

3.3.9. Confidence in financial markets

Perotti and Schwienbacher (2009) find that countries that experienced large hyperinflationary shocks and financial losses in the early 20th century now have lower levels of pension funding. The authors posit that these strong price shocks had an important impact on political preferences regarding the relevance of capital markets and the role of the state in pension provision. Middle-class individuals in countries subjected to major increases in prices suffered vast financial losses and consequently their political preferences no longer supported the financial markets as much. These countries would then end up with pension systems dominated by state provision organized on a PAYG basis. In contrast, in countries where the middle class did not lose their savings, capital markets continued to have political support, which then led to the implementation of pension funding.

Since low pension funding is a feature of Bismarck-like pension systems, we would expect a positive association between inflationary shocks, the 1929 Great Depression, and the Bismarckian factor. We control for these shocks using the variables

used by Perotti and Schwienbacher (2009).[15] The variable INFLATION_SHOCK is a dummy variable equal to one in the case where a country experienced an increase of over 400% in the consumer price index (CPI) during 1900–1970 (or before the introduction of the pension system). Finally, the variable CRASH_1929 is the level of stock market crash during the 1930s Great Depression.

3.4. Descriptive statistics

Descriptive statistics for the variables used in our regression analysis are reported in Table 2a. On average, the Bismarckian factor was 0.363 between 1988 and 2008. As for the independent variables, it stands out that 43% of individuals had confidence in the civil service and 38% believed that most people could be trusted. Furthermore, 26% of the countries in the sample experienced, at least once, an annual increase in CPI of more than 400% between 1900 and 1970. Finally, the countries in the sample had average losses in the stock markets of 61.8% during the Great Depression.

4. Empirical results

This section presents the results of the empirical analysis and determines the robustness using alternative measures of the dependent and independent variables.

4.1. Regression results

Panels A–D in Table 3 report the results of OLS regressions with the Bismarckian factor as the dependent variable and power distance, individualism, masculinity, and uncertainty avoidance as the main independent variables, respectively.

4.1.1. Power distance

In Model 1 of Panel A, the results indicate that power distance is positively significant at the 5% level. Table 2b indicates a significant correlation between power distance and the control variables Confidence in Civil Services, GDP per capita, Trust, and Trade Union Density. To address this potential multicollinearity, power distance is orthogonalized against each of these control variables, respectively, and only the residual of the power distance variable is included in the main regressions. In Models 2–11, different controls are added. In these regressions, we observe that power distance remains significant in most Models (2, 4, 6, 7 and 9).

The results of Panel A support our hypothesis of a significantly positive association between power distance and the Bismarckian factor. These results are consistent with Corneo and Grüner (2002), who report that countries that place high regard for status have a lower preference for income redistribution.

4.1.2. Individualism

In Panel B, the results show a negatively significant relationship between individualism and the Bismarckian factor. Table 2b shows a significant correlation between individualism and the control variables Confidence in Civil Services, Inflation Shock, and Crash 1929. To address potential multicollinearity, individualism is orthogonalized against each of these control variables, respectively, and only the residual of the individualism variable is included in the main regressions. The hypothesis that the relationship between the Bismarckian factor and individualism was inconclusive because there were arguments supporting both a negative and a positive association with the Bismarckian factor. The negative sign of the association in Panel B is consistent with the rationale that in countries with high individualism, individuals would prefer more freedom in making their own pension-related decisions, which is a feature more characteristic of private pension plans than of earnings-related public plans. However, this association is not significant when we control for Confidence in Civil Services (Model 5) and Trust (Model 8).

4.1.3. Masculinity

The regression results reported in Panel C do not support our third hypothesis, which is a significantly positive association between the cultural dimension of masculinity and the Bismarckian factor.

4.1.4. Uncertainty avoidance

Panel D presents the results for the uncertainty avoidance cultural dimension. We use the orthogonalized version of the uncertainty avoidance variable in those cases when there is a significant correlation with the control variables (see Table 2b). All models in Panel D show a significant coefficient apart from Model 8, which controls for Trade Union Density. This means that there is strong support for the hypothesis that there is a significantly positive association between uncertainty avoidance and the Bismarckian factor. Furthermore, this finding implies that individuals in countries with high uncertainty avoidance prefer to rely less on financial markets and instead support Bismarckian public earnings-related pensions. The reason for this is that state-run schemes are less dependent on financial market performance.

[15] Perotti and Schwienbacher (2009) use data on price series from the Global Financial Database, Maddison (1991), Mitchell (1992), and several national banks and governmental statistical agencies. Data on the 1929 financial crash are from Taylor (2002).

Table 2a
Variables used in the paper and descriptive statistics.

Variable	*N*	Mean	Standard deviation	Definition and source	Expected sign
Bismarkian factor	25	0.36	0.19	*Krieger and Traub (2013)*. This indicator can be regarded as a measure of the level of intragenerational redistribution in public pensions. A higher value of the Bismarckian factor means less within-generation redistribution.	
Power distance	25	43.40	18.46	*Hofstede (2001)*. Power distance expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. People in societies exhibiting a large degree of power distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low power distance, people strive to equalize the distribution of power and demand justification for inequalities of power.	+
Individualism	25	65.76	17.14	*Hofstede (2001)*. Individualism is defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in a society in which individuals expect their relatives or members of an in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."	Uncertain
Masculinity	25	50.12	23.06	*Hofstede (2001)*. This cultural dimension represents a preference in society for achievement, heroism, assertiveness and material rewards for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented.	+
Uncertainty avoidance	25	65.80	22.78	*Hofstede (2001)*. This cultural dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong uncertainty avoidance maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak uncertainty avoidance societies maintain a more relaxed attitude in which practice counts more than principles.	+
Median age	25	40.01	4.12	*CIA World Factbook 2005*	Uncertain
Government left	23	0.38	0.19	*Comparative Political Data Set III*. It is the percentage of social democratic and other left-wing parties in all cabinet posts between 1990 and 2005.	–
Ethnic fractionalization	25	0.25	0.20	Index of ethnic fractionalization of *Alesina et al. (2003)*	+
Confidence in civil services	16	0.43	0.16	*World Values Survey*. Percentage of people responding that they have "a great deal" or "quite a lot" of confidence in their country's civil services.	+
GDP per capita	25	3135	11,316	*World Development Indicators*. The purchasing power parity GDP per capita (in constant 2005 US dollars).	Uncertain
Gini	24	31.97	6.67	*CIA World Factbook*. Gini coefficient from the 2005.	–
Trust	16	0.38	0.18	*World Values Survey*. Percentage responding affirmatively that most people could be trusted.	Uncertain
Trade union density	24	33.42	19.65	*OECD statistics*. Averages of trade union density for the period 2000–2005.	–
Inflation shock	19	0.26	0.45	*Perotti and Schwienbacher (2009)*. It is a dummy variable equal to one if the country experienced an increase in its CPI of 400% or more in a single year and zero otherwise.	+
Crash 1929	16	61.80	21.35	*Perotti and Schwienbacher (2009)*. It is the level of stock market crash during the 1930s Great Depression.	+

Table 2b
Correlation matrix.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	Bismarkian Factor	1														
(2)	Power distance	0.5026[b]	1													
(3)	Individualism	−0.3726	−0.5825[a]	1												
(4)	Masculinity	0.0337	0.1408	0.1333	1											
(5)	Uncertainty Avoidance	0.5027[b]	0.1834	−0.2207	−0.0582	1										
(6)	Median age	0.2130	−0.3541[b]	0.4552[a]	−0.023	0.0879	1									
(7)	Government left	0.1795	−0.0360	−0.0838	−0.4503[b]	0.1009	0.2739	1								
(8)	Ethnic fractionalization	−0.0708	0.1912	−0.0777	0.1552	−0.0235	−0.4310[a]	−0.2631	1							
(9)	Confidence in civil services	−0.2314	0.0037	0.0779	−0.0714	−0.6324[a]	−0.0018	0.2150	0.0163	1						
(10)	GDP per capita	−0.1172	−0.5475[a]	0.5606[a]	−0.0616	−0.2703[c]	0.6184[a]	−0.1345	−0.2165	0.1262	1					
(11)	Gini	0.1359	0.2825[c]	−0.4248[a]	0.0398	0.1182	−0.7853[a]	−0.2782	0.5499[a]	−0.0892	−0.5547[a]	1				
(12)	Trust	−0.4141	−0.6226[a]	0.4500[a]	−0.2153	−0.5738[a]	0.5012[a]	0.1965	−0.3257[c]	0.4415[a]	0.5937[a]	−0.6297[a]	1			
(13)	Trade union density	−0.1948	−0.4050[b]	0.2533	−0.4038[b]	−0.4547[a]	0.2168	0.2012	−0.2369	0.3384	0.4020[b]	−0.5345[a]	0.6858[a]	1		
(14)	Inflation shock	0.5104[b]	0.2228	−0.5090[b]	0.3364	0.4145[b]	0.0058	0.1221	−0.0988	−0.3019	−0.4861[b]	0.2578	−0.4640[c]	−0.2659	1	
(15)	Crash 1929	0.2684	−0.1986	0.5924[b]	−0.1461	−0.0393	0.6218[a]	−0.1604	0.0841	0.3894	0.5426[b]	−0.3889	0.2456	0.0331	−0.2797	1

This table presents the correlations between the variables in the sample. The superscript "a" stands for significant at 1 percent level; "b" for significant at 5 percent level; and "c" for significant at 10 percent level. All the variables are described in Table 2a. The dataset and the replication Stata do-files are available upon request.

In sum, the empirical results broadly support our expectations. Table 3 shows that the Bismarckian factor has a positive relationship with the power distance and uncertainty avoidance cultural dimensions, and a negative association with individualism. To assess the robustness of these findings, two types of tests were performed, although the results are not shown here.[16] First, we examined the robustness of the results by using an alternative measure of the structure of public pensions, namely, the actuarial share of public pensions computed by Disney (2004).[17] Second, we replaced the Bismarkian Factor by the OECDś Pension Progressivity Index (OECD, 2011), which encompasses also the second pillar. Finally, we also used the updated scores of the Hofstede data set by Tang and Koveos (2008). The results are largely robust to these alternative specifications.

4.2. Endogeneity in the relationships between culture and the structure of public pensions

The empirical results so far show how Hofstede's cultural dimensions of power distance, individualism, and uncertainty avoidance are associated with the level of intragenerational redistribution of public pension systems. So far it has been assumed that the cultural determinants are exogenous, or, in other words, that they are not correlated with the error term in our regression models. However, our results could suffer from endogeneity problems. The three most common sources of endogeneity are reverse causality, omitted variables, and measurement error.

Regarding the first source of endogeneity, it could be argued that the structure of a country's public pensions could have an effect on the values of its population, which then would be expressed in its cultural dimension scores. Since the introduction of most pension plans took place in the first half of the 20th century (Perotti and Schwienbacher, 2009) and, therefore, before Hofstede collected the data to derive his cultural dimensions, one could claim that this direction of causality is possible. However, cultural change in the form of changes in values is very slow. Hofstede et al. (2010) argue that "national value systems should be considered given facts, as hard as a country's geographical position or its weather" (Hofstede et al., 2010: 20). Williamson (2000) also posits that the frequency of cultural changes ranges between 100 and 1000 years. Consequently, it does not seem very likely that values and beliefs of individuals were shaped within a few decades after the introduction of public pension systems.

As for the other two sources of endogeneity, it is possible that the structure of public pension systems and the cultural dimensions may be determined by a third factor that we fail to control for (i.e., an omitted variable) or that some of our independent variables have measurement errors. To partially address this issue, we employ an instrumental variables methodology. The goal is to use a variable or set of variables that are correlated with the endogenous independent variables (e.g., cultural dimensions) but that do not have a direct effect on the dependent variable (e.g., Bismarckian factor).

In the literature, we find that different country characteristics have been used as instruments for cultural dimensions: grammatical features of languages (Licht et al., 2007; Shao et al., 2013), genetics (Shao et al., 2013), and the demographics of populations (Kwok and Tadesse, 2006), as well as religion and the geographical locations of countries (Kwok and Tadesse, 2006). In the next sections, we present the variables that will be used as instruments for power distance, individualism, and uncertainty avoidance.

4.2.1. Instruments for power distance

We use two types of instruments to isolate the exogenous component of power distance: grammatical rules and geography. First, Kashima and Kashima (1998) study the connections between culture and the rules of languages. One of the language features in which the authors are interested is the number of second-person singular pronouns, such as *you* in English, *usted* and *tú* in Spanish, and *du* and *Sie* in German. The authors argue that, compared to individuals in languages with only one second-person pronoun, individuals in languages with multiple second-person pronouns have a conception of relationships based on social distance (vertical distance) and in-group–out-group differentiation (horizontal distance). They find evidence suggesting that countries with multiple second-person pronouns have higher scores in power distance and lower levels of individualism.

Second, a country's latitude has been found to be inversely associated with the level of power distance in a society. Hofstede (2001) conjectures that this relationship can be explained by the need for technology to survive in different climatic environments. In colder climates, the major threat to survival was cold temperatures and survival therefore involved the mastery of technical skills. In contrast, in more tropical climates, the major threat to survival was aggression by other groups.[18] In our analysis we use the absolute value of a country's latitude, scaled according to La Porta et al. (1999) to take values between zero and one.

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[16] The results of the robustness checks are available upon request.

[17] Disney (2004) calculates the within-generation tax component of public pensions' contribution rates. The idea behind this indicator, based on replacement rates calculated by Blöndal and Scarpetta (1998), is that contributions to public pensions can be used for two purposes: (1) saving for future income in old age, and (2) intragenerational redistribution among individuals. Disney's (2004) tax component of public pensions' contribution rates is therefore the percentage of contribution rates to public pensions that is used for redistributive purposes.

[18] A possible explanation of why power distance is lower in societies with colder climates is that all individuals had to work together to survive under these rough conditions. The urgency of close collaboration among different types of individuals might have resulted in smaller distances between those in power and the rest. Something different could have taken place in warmer climates. There, societies had to be organized to deal with the frequent attacks of enemy groups. One form of organization was the creation of special groups of warriors who had the task of defending from and attacking other societies. The distinction of roles in these societies and how power was given to warriors and the rest of individuals may have been one of the first expressions of power distance.

Table 3
OLS regressions of the Bismarkian factor and several independent variables.

Dependent variable: Bismarkian factor	Model:	1	2	3	4	5ort	6ort	7	8ort	9ort	10	11
	Exp. sign	Panel A: Power distance										
Power distance	+	0.520[b]	0.536[c]	0.474	0.573[c]	14.421	11.292[b]	0.517[b]	12.805	9.240[b]	0.489	0.620
		(0.195)	(0.185)	(0.269)	(0.189)	(7.475)	(4.282)	(0.213)	(6.026)	(4.358)	(0.253)	(0.293)
Median age	?		1.139									
			(0.557)									
Government left	–			10.034								
				(17.138)								
Ethnic fractionalization	+				−19.995							
					(13.314)							
Confidence in civil services	+					3.918						
						(7.371)						
GDP per capita	?						2.635					
							(2.483)					
Gini	–							0.027				
								(0.454)				
Trust	?								1.874			
									(5.687)			
Trade union density	–									0.087		
										(3.384)		
Inflation shock	+										18.733[b]	
											(7.313)	
Crash 1929	+											0.357
												(0.170)
R^2		0.25	0.31	0.19	0.29	0.31	0.26	0.25	0.30	0.20	0.44	0.36
N		25	25	23	25	16	25	24	16	24	19	16

Table 3
(*continued*)

Dependent variable: Bismarkian factor	Model:	1	2	3	4	5ort	6ort	7	8	9	10ort	11ort
	Exp. sign	Panel B: Individualism										
Individualism	?	−0.414[b] (0.169)	−0.478b (0.188)	−0.477[b] (0.194)	−0.429[b] (0.182)	−9.624 (5.799)	−9.622[b] (4.084)	−0.404[b] (0.182)	−0.293 (0.252)	−0.463[a] (0.161)	−10.198[b] (4.257)	−9.101[b] (3.200)
Median age	?		1.369 (0.825)									
Government left	–			5.939 (18.162)								
Ethnic fractionalization	+				−11.127 (16.567)							
Confidence in civil services	+					−1.304 (5.557)						
GDP per capita	?						0.305 (1.975)					
Gini	–							0.218 (0.497)				
Trust	?								−29.009 (27.095)			
Trade union density	–									−0.167 (0.216)		
Inflation shock	+										5.767 (2.748)	
Crash 1929	+											12.314[a] (2.792)
R^2		0.14	0.22	0.18	0.15	0.18	0.14	0.15	0.24	0.22	0.31	0.56
N		25	25	23	25	16	25	24	16	24	19	16

Table 3
(*continued*)

Dependent variable: Bismarkian factor	Model:	1	2	3ort	4	5	6	7ort	8ort	9ort	10ort	11
	Exp. sign	Panel C: Masculinity										
Masculinity	+	0.027	0.058	−0.091	0.045	−0.167	0.006	−0.196	−4.380	−0.871	0.413	0.115
		(0.145)	(0.148)	(3.780)	(0.150)	(0.174)	(0.156)	(3.495)	(3.477)	(3.759)	(3.895)	(0.182)
Median age	?		1.040									
			(1.063)									
Government left	–			3.405								
				(3.199)								
Ethnic fractionalization	+				−8.073							
					(17.855)							
Confidence in civil services	+					−33.077						
						(22.831)						
GDP per capita	?						0.000					
							(0.000)					
Gini	–							4.236				
								(4.137)				
Trust	?								−11.016[b]			
									(3.662)			
Trade union density	–									−4.512		
										(4.234)		
Inflation shock	+										10.966[c]	
											(3.307)	
Crash 1929	+											0.274
												(0.316)
R^2		0.00	0.05	0.04	0.00	0.09	0.01	0.02	0.33	0.05	0.28	0.09
N		25	25	23	25	16	25	24	16	24	19	16

Table 3
(*continued*)

Dependent variable: Bismarkian factor	Model:	1	2	3	4	5ort	6ort	7	8ort	9ort	10ort	11
	Exp. sign	Panel D: Uncertainty avoidance										
Uncertainty avoidance	+	0.421[a]	0.423[a]	0.446[b]	0.447[c]	10.662[b]	10.515[c]	0.416[c]	10.599	10.346[c]	12.925[a]	0.614[c]
		(0.145)	(0.146)	(0.157)	(0.147)	(4.845)	(3.624)	(0.146)	(5.359)	(3.134)	(3.810)	(0.203)
Median age	?		1.010									
			(1.013)									
Government left	–			6.566								
				(23.283)								
Ethnic fractionalization	+				−16.272							
					(14.635)							
Confidence in civil services	+					2.045						
						(5.179)						
GDP per capita	?						2.961					
							(3.677)					
Gini	–							0.275				
								(0.427)				
Trust	?								−0.576			
									(3.972)			
Trade union density	–									0.066		
										(0.206)		
Inflation shock	+										10.218	
											(6.702)	
Crash 1929	+											0.252
												(0.199)
R^2		0.25	0.30	0.32	0.28	0.29	0.26	0.26	0.28	0.33	0.48	0.47
N		25	25	23	25	16	25	24	16	24	19	16

Ordinary least squares regressions of the Bismarkian Factor and cultural dimensions. The dependent variable is Krieger and Traub's (2013) Bismarckian factor. This indicator can be regarded as a measure of the level of intragenerational redistribution in public pensions. A higher value of the Bismarckian factor means less within-generation redistribution. In the regressions, the averages of the Bismarckian for the period 1988–2008 were used. Moreover, for the sake of the readability of the parameter estimates, in the empirical analysis the Bismarckian factor has been multiplied by 100. The independent variables are the cultural dimensions of power distance (in Panel A), individualism (in Panel B), masculinity (in Panel C) and uncertainty avoidance (in Panel D) of Hofstede (2001). Each panel shows 11 regressions models. Model 1 shows the basic regression between the dependent variable and the independent variable while in models 2 to 11 different controls are added. The rationale for each regression model is explained in the text and full descriptions of the variables can be found in Table 1. When the independent variable has a significant correlation with a control variable, an orthogonalized version (ort) of the independent variable is used. Robust standard errors are shown in parentheses. The superscript "a" stands for significant at 1 percent level; "b" for significant at 5 percent level; and "c" for significant at 10 percent level. The intercept is included in all regressions but not reported. All the variables are described in Table 1. The dataset and the replication Stata do-files are available upon request.

The correlation coefficients between the cultural dimensions and the instrumental variables used in the analysis are not shown here.[19] There is a significant, positive correlation between the dummy variable *Second Pronoun* and power distance. Moreover, the negative correlation between *Latitude* and power distance is non-significant in our sample; nevertheless, for a broader sample of countries ($N = 53$) this correlation is significant. Moreover, it can be argued that there is no clear association between grammatical rules, the geographical positions of countries, and the configurations of public pension systems. Therefore, we think that *Second Pronoun* and *Latitude* could be valid instruments for power distance.

4.2.2. Instruments for individualism

We use two types of instruments to isolate the exogenous component of individualism: grammatical rules and genetics. First, as was mentioned earlier, Kashima and Kashima (1998) find a negative correlation between individualism and *Second Pronoun*. Second, in addition to studying second-person singular pronouns, the authors also investigate the relationship between culture and the linguistic characteristic of first-person singular pronoun drop,[20] such as *I* in English and *yo* in Spanish. They argue that explicit use of the first-person singular pronoun is related to the psychology of the self and the other in discourse. The inclusion or absence of the first-person singular pronoun highlights the importance of the speaker's person in the context of speech. Kashima and Kashima (1998) find a negative correlation between individualism and pronoun drop. This dummy variable has already been used in the literature as an instrument for individualism (Licht et al., 2007; Shao et al., 2013).

Third, we use genetic distance as an instrument for individualism. Genetic distance measures the differences in genetic frequencies across populations. A small genetic distance indicates that populations have shared ancestors or that in the past they were the same population (Spolaore and Wacziarg, 2009). Spolaore and Wacziarg (2009) also argue that genetic distance can be interpreted as a summary of the divergence of implicit beliefs, customs, and conventions that are transmitted across generations. In addition, Cavalli-Sforza et al. (1994) and Stone et al. (2006) posit that genetic distance could be relevant to understanding cultural differences since it can be used as a proxy for the vertical transmission of cultural traits.

Based on these interpretations of genetic distance, Shao et al. (2013) use the genetic distance from the United States as an instrument for individualism. They use the index of genetic distance F_{st} of Cavalli-Sforza et al. (1994) for 42 world populations.[21] Giuliano et al. (2014) argue that a problem with this world index is that genetic distance is a measure across populations, not across countries. Therefore, the mismatch between countries and populations could create some measurement error. However, in Europe there is a clearer overlap between the two concepts (Giuliano et al., 2014). This explains why in this paper we use the F_{st} index of Cavalli-Sforza for the European sample.[22] More specifically, we use the F_{st} distance from the United Kingdom as an instrument for individualism.

In the online appendix, we show that *Second Pronoun, Pronoun Drop,* and *Genetic Distance* have highly significant, negative correlations with individualism (p-Values < 0.01). Moreover, we argue that there is no clear association between grammatical rules, genetic distances, and the configurations of public pension systems. Therefore, we think that *Second Pronoun, Pronoun Drop,* and *Genetic Distance* could be valid instruments for individualism.

4.2.3. Instruments for uncertainty avoidance

We use two grammatical rules as instrumental to isolate the exogenous component of uncertainty avoidance. Kashima and Kashima (1998) report the unexpected finding of a positive correlation between *Second pronoun, Pronoun drop,* and uncertainty avoidance. The explanation that the authors offer for these findings is that speakers of languages with pronoun drop and multiple second-person pronouns have to adjust their discourse depending on the circumstances. As a result of this frequent adjustment of speech, individuals might experience some degree of stress, which is a characteristic of countries with high uncertainty avoidance.

Moreover, Kwok and Tadesse (2006) use various country characteristics as instruments for uncertainty avoidance. They focus on religion (percentage of people of the Catholic, Protestant, and Muslim faiths), ethnic heterogeneity, and geography (the country's continent).[23] A drawback with these instruments is that the authors do not provide a clear rationale of the connection between scores in uncertainty avoidance and three of these variables. Moreover, the correlation analyses in the online appendix show that a dummy variable for Eastern European countries is the only variable with a significant correlation with uncertainty avoidance. Therefore, these variables are not used in our instrumental variables regressions.

4.2.4. Results of regressions with instrumental variables

Table 4, Panel A through C, shows the regressions of cultural dimensions on the Bismarckian factor using instrumental variables (IV). Generally, we observe that in most regressions the coefficients of power distance (Panel A), individualism (Panel B), and uncertainty avoidance (Panel C) not only remain significant, but some of the models show significance where there was not in the least-squares regressions.

[19] The dataset and the replication Stata do-files are available upon request.

[20] Pronoun drop refers to the possibility that a language offers of excluding the first-person singular pronoun in the context of a sentence. While the pronoun *I* in the sentence *I am reading a book* is compulsory in the English language, in Spanish the pronoun *yo* can be dropped. That means that the sentences *yo estoy leyendo un libro* and *estoy leyendo un libro* are grammatically correct and have exactly the same meaning.

[21] "This index is based on the frequency of 128 alleles related to 45 genes and includes alleles coding for blood groups, lymphocyte antigens, immunoglobulin, hemoglobin, and enzymes. The genes were selected so that they are (1) selectively neutral and (2) easy to collect. F_{st} takes a value equal to

Table 4
Instrumental variables regressions and the Bismarckian factor.

Dependent variable: Bismarkian factor	Model:	1	2	3	4	5	6	7	8	9	10	11
	Exp. sign	Panel A: Power distance										
Power distance	+	0.852[a]	0.992[a]	1.022[b]	0.997[a]	0.988	1.261[b]	1.143[a]	1.538[b]	1.074[b]	0.386	1.143[a]
		(0.333)	(0.353)	(0.408)	(0.346)	(0.548)	(0.552)	(0.424)	(0.714)	(0.428)	(0.339)	(0.300)
Median age	?		1.269									
			(0.812)									
Government left	–			0.617								
				(22.800)								
Ethnic fractionalization	+				−29.778							
					(17.021)							
Confidence in civil services	+					38.339						
						(47.502)						
GDP per capita	?						0.001					
							(0.001)					
Gini	–							−0.420				
								(0.758)				
Trust	?								75.412			
									(54.402)			
Trade union density	–									0.246		
										(0.245)		
Inflation shock	+										19.547[a]	
											(6.827)	
Crash 1929	+											0.437[a]
												(0.130)
R^2		0.15	0.12	.	0.14	0.28	.	.	0.14	.	0.43	0.15
N		25	25	23	25	16	25	24	16	24	19	16

Table 4
(*continued*)

Dependent variable: Bismarkian factor	Model:	1	2	3	4	5	6	7	8	9	10	11
	Exp. sign	Panel B: Individualism										
Individualism	?	−0.660[a]	−0.581[b]	−0.617[a]	−0.628[a]	−1.012	−0.663[c]	−0.676[c]	−0.924	−0.631[c]	−0.691[b]	−1.303[a]
		(0.232)	(0.240)	(0.232)	(0.234)	(0.567)	(0.246)	(0.222)	(0.478)	(0.210)	(0.284)	(0.346)
Median age	?		1.683									
			(1.219)									
Government left	–			21.710								
				(17.085)								
Ethnic fractionalization	+				−25.825							
					(29.143)							
Confidence in civil services	+					24.258						
						(46.290)						
GDP per capita	?						0.000					
							(0.000)					
Gini	–							0.603				
								(0.923)				
Trust	?								−1.680			
									(28.991)			
Trade union density	–									−0.156		
										(0.222)		
Inflation shock	+										13.115	
											(6.983)	
Crash 1929	+											0.820[a]
												(0.179)
R^2		0.15	0.20	0.18	0.20	0.09	0.14	0.16	0.21	0.18	0.32	0.54
N		19	19	19	19	16	19	19	16	19	15	16

Table 4
(*continued*)

Dependent variable: Bismarkian factor	Model:	1	2	3	4	5	6	7	8	9	10	11
	Exp. sign	Panel C: Uncertainty avoidance										
Uncertainty avoidance	+	0.492[c]	0.518[c]	0.584[a]	0.501[c]	0.722[b]	0.588[c]	0.488[c]	0.779	0.654[a]	0.591[c]	0.921[a]
		(0.170)	(0.159)	(0.150)	(0.183)	(0.363)	(0.193)	(0.171)	(0.456)	(0.195)	(0.209)	(0.194)
Median age	?		1.016									
			(0.956)									
Government left	–			2.956								
				(24.311)								
Ethnic fractionalization	+				−17.689							
					(17.427)							
Confidence in civil services	+					26.297						
						(46.433)						
GDP per capita	?						0.000					
							(0.000)					
Gini	–							0.253				
								(0.437)				
Trust	?								21.613			
									(49.947)			
Trade union density	–									0.151		
										(0.261)		
Inflation shock	+										6.619	
											(7.925)	
Crash 1929	+											0.248
												(0.158)
R^2		0.24	0.29	0.29	0.28	0.27	0.25	0.25	0.23	0.30	0.46	0.37
N		25	25	23	25	16	25	24	16	24	19	16

Instrumental variables regressions of the Bismarkian Factor and cultural dimensions. The dependent variable is Krieger and Traub's (2013) Bismarckian factor. This indicator can be regarded as a measure of the level of intragenerational redistribution in public pensions. A higher value of the Bismarckian factor means less within-generation redistribution. In the regressions, the averages of the Bismarckian for the period 1988–2008 were used. Moreover, for the sake of the readability of the parameter estimates, in the empirical analysis the Bismarckian factor has been multiplied by 100. The independent variables are the cultural dimensions of power distance (in Panel A), individualism (in Panel B), masculinity (in Panel C) and uncertainty avoidance (in Panel D) of Hofstede (2001). The instrumental variables for power distance in Panel A are Pronoun Drop and Latitude. The variable Pronoun Drop is a dummy variable that equals one if a country's grammatical rules allow person-indexing pronoun drop (Kashima and Kashima, 1998) and Latitude is the absolute value of a country's latitude, scaled to take values between zero and one (La Porta et al., 1999). The instrumental variables for individualism in Panel B are Second Pronoun, Pronoun Drop, and Genetic Distance. The variable Second Pronoun is a dummy variable that equals one if a country's grammatical rules have two or more second-person singular pronouns (Kashima and Kashima, 1998) and the variable Genetic Distance, from HYPERLINK \l "bib11" Cavalli-Sforza et al. (1994), measures genetic differences between two populations. In this paper, a higher value means a country's population is more genetically different from that of the United Kingdom. The instrumental variables for uncertainty avoidance in Panel C are Second Pronoun and Pronoun Drop. Each panel shows 11 regressions models. Model 1 shows the basic regression between the dependent variable and the independent variable while in models 2 to 11 different controls are added. The rationale for each regression model is explained in the text and full descriptions of the variables can be found in Table 1. Robust standard errors are shown in parentheses. The superscript "a" stands for significant at 1 percent level; "b" for significant at 5 percent level; and "c" for significant at 10 percent level. The intercept is included in all regressions but not reported. All the variables are described in Table 1. The dataset and the replication Stata do-files are available upon request.

When we compare the results for power distance in Table 4 Panel A with those of the exogenous component of power distance in Table 3 Panel A, we see that the size of the coefficients is markedly greater in the latter case. In addition, in Table 3 power distance does not have a significant coefficient after controlling for Government Left (Model 3), Confidence in civil services (Model 5) and Trust (Model 8); however, in Table 4 Panel A, Models 3 and 8 show statistical significance. Moreover, regarding the comparisons between the base models for individualism (Table 3 Panel B) and uncertainty avoidance (Table 3 Panel D) and their corresponding instrumental variables regressions of these two cultural dimensions, we see that the size of the coefficients is also higher in the regressions with instrumental variables.

All in all, based on the instrumental variables results, it may be reasonable to conclude that the relationships found so far between the Bismarckian factor and the cultural dimensions of power distance, individualism, and uncertainty avoidance are less likely to be affected by the omitted variable bias.

4.3. Analysis of the results: culture and the redistribution of public and private pensions

As mentioned earlier, Aggarwal and Goodell (2012) investigate the configuration of national pension systems using characteristics of national culture as plausible explanatory factors. Their measure of progressivity is taken from the OECD (2011) and indicates to what extent pension benefits (from both mandatory public and private plans) reflect lifetime earnings. In the companion online appendix, we also present the regressions replacing the Bismarkian Factor by the progressivity measure used by Aggarwal and Goodell (2012) and show that the results are consistent. In any case, it is also important to mind the differences among the OECD progressivity and the Bismarkian factor indices, as the latter focuses on first pillar public pensions while the second encompasses second pillar private pensions.

Indeed, if we combine our findings with those of Aggarwal and Goodell (2012), we can compare how the associations of national culture with pension redistribution differ between public and private schemes. First, uncertainty avoidance is negatively related to the redistribution of public and private pension schemes. Second, based on our results, the cultural dimension of masculinity does not have a significant association with the level of redistribution of public pensions. However, according to Aggarwal and Goodell (2012), masculinity has a negative association with the redistribution of total pension benefits, that is, the addition of public and private benefits. Hence, interpreting these results would suggest that the negative effect of masculinity is significant only within private pensions.

Third, our result that individualism is positively associated with public pensions' redistribution is not in line with Aggarwal and Goodell (2012), who find a negative relationship for individualism. As we hypothesize, the association regarding individualism is ambiguous because there are sets of arguments supporting a positive and a negative relationship (see Section 4.1.2.). Therefore, based on our results, we argue that the negative effect found in private pensions would outweigh the positive effect in public pensions. As a result, the overall effect of individualism on pension redistribution would be negative. Finally, power distance has no robust association with the redistribution of public pensions, a result that is in line with the non-significant result of Aggarwal and Goodell (2012).

5. Summary and conclusions

Countries differ in the ways their public pensions are organized. While some countries have a high degree of intragenerational redistribution of public pensions (e.g., Australia, Denmark, and Switzerland), others have public pension systems with a close link between contributions and benefits (e.g., France, Greece, and Germany) and limited redistribution. According to the literature, these cross-country differences can be explained by the outcome of political processes in which different groups in society try to defend their interests (i.e., rich versus poor, young versus old) (Conde-Ruiz and Profeta, 2007) or by the preferences for redistribution expressed by the individuals in a society (Tausch et al. (2013)). In this paper, we document how national cultural traits have a significant relationship with the configurations of public pension systems.

This paper provides a couple of important contributions to the literature on social security and pension systems. First, using Krieger and Traub's (2013) Bismarckian factor as a measure of the level of intragenerational redistribution of public pensions, we find that uncertainty avoidance has a significant, positive association with the Bismarckian factor. The relationship with individualism is negative. These results are robust to using alternative measures of the dependent variable, updated versions of Hofstede's cultural dimensions, and the implementation of instrumental variables. Second, comparing our results with those of Aggarwal and Goodell (2012), we observe that the association of uncertainty avoidance has the same direction as the income redistribution of public and private pensions.

Our findings have important public policy implications. The issue of pension reform remains high on the agendas of governments as an attempt to curb the impact of population aging and rising life expectancies on government budgets (Lindbeck and Persson, 2003). One way to do this is by making a transition from public earning-related pension schemes to private plans (Börsch-Supan, 2012). We argue that such a transformation of public to private pension provision should

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zero if and only if the allele distributions are identical across the two populations, whereas it is positive when the allele distributions differ. A higher F_{st} is associated with larger differences" (Giuliano et al., 2014: 183).

[22] Countries included in the European sample are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Macedonia, the Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, Switzerland, and the United Kingdom.

[23] The variables *Religion* and *Ethnic Heterogeneity* are taken from La Porta et al. (1999).

be evaluated considering the cultural background of countries. For instance, countries that show a high level of uncertainty avoidance tend to oppose a large role of financial systems and the risks they involve, and therefore seem to prefer public pensions with high replacement rates, since this would limit the necessity of private pension provision and reduce the role of financial markets in the pension system. Therefore, a proposal for pension reforms that would abolish Bismarckian public pensions is likely to face public resistance in such countries. In other words, there is no golden recipe for sustainable pension schemes, as the fiscal dimension has to be complemented with the dimension of cultural fit to the country.

Finally, as in other studies, this investigation has some limitations. Since our sample size is limited (at most 25 countries), our results have to be seen as preliminary and therefore any conclusions drawn from them are only of an indicative nature. Moreover, our empirical tests do not examine causal relationship. Hence, what we find are significant associations between cultural factors and the configurations of public pension systems.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jce.2017.05.001.

References

Aggarwal, R., Goodell, J., 2012. Political-economy of pension plans: impact of institutions, gender, and culture. J. Bank. Financ. 37 (6), 1860–1879.
Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., Wacziarg, R., 2003. Fractionalization. J. Econ. Growth 8 (2), 155–194.
Alesina, A., Giuliano, P., 2010a. Preferences for redistribution. In: Benhabib, J., Bisin, A., Jackson, M. (Eds.). In: Handbook of Social Economics, vol. 1A. North Holland, San Diego, pp. 93–131.
Alesina, A., Giuliano, P., 2010b. The power of the family. J. Econ. Growth 15 (2), 93–125.
Alesina, A., Glaeser, E.L., 2004. Fighting Poverty in the US and Europe: A World of Difference. Oxford University Press, Oxford.
Bellemare, C., Kröger, S., van Soest, A., 2008. Measuring inequity aversion in a heterogeneous population using experimental decisions and subjective probabilities. Econometrica 76 (4), 815–839.
Bergh, A., Bjørnskov, C., 2011. Historical trust levels predict the current size of the welfare state. Kyklos 64 (1), 1–19.
Blöndal, S., Scarpetta, S., 1998. The Retirement Decision in OECD Countries. OECD Economics Department Working Paper 202. Organization for Economic Co-operation and Development, Paris.
Börsch-Supan, A.H., 2012. Entitlement reforms in Europe: Policy mixes in the current pension reform process. In: Alesina, A., Giavazzi, F. (Eds.), Fiscal Policy After the Financial Crisis. University of Chicago Press, Chicago, pp. 405–435.
Cavalli-Sforza, L.L., Menozzi, P., Piazza, A., 1994. The History and Geography of Human Genes. Princeton University Press, Princeton.
Chui, A.C., Kwok, C.C., 2008. National culture and life insurance consumption. J. Int. Bus. Stud. 39 (1), 88–101.
Conde-Ruiz, I., Profeta, P., 2007. The redistributive design of social security systems. Econ. J. 117, 686–712.
Corneo, G., Grüner, H.P., 2000. Social limits to redistribution. Am. Econ. Rev. 90 (5), 1491–1507.
Corneo, G., Grüner, H.P., 2002. Individual preferences for political redistribution. J. Pub. Econ. 83 (1), 83–107.
Cravens, K.S., Oliver, E.G., 2000. The influence of culture on pension plans. Int. J. Account. 35 (4), 521–537.
Disney, R., 2000. Declining public provision in an era of demographic ageing: will private provision fill the gap? Eur. Econ. Rev. 44 (4), 957–973.
Disney, R., 2004. Are contributions to public pension programmes a tax on employment? Econ. Policy 19 (39), 267–311.
Disney, R., Johnson, P. (Eds.), 2001. Pension Systems and Retirement Incomes Across OECD Countries. Edward Elgar Publishing, Cheltenham.
Easterly, W., Levine, R., 1997. Africa's growth tragedy: Policies and ethnic divisions. Q. J. Econ. 112 (4), 1203–1250.
Esarey, J., Salmon, T., Barrilleaux, C., 2012. Social insurance and income redistribution in a laboratory experiment. Polit. Res. Q. 65 (3), 685–698.
Esping-Andersen, G., 1990. The Three Worlds of Welfare Capitalism, vol. 6. Polity Press, Cambridge, England.
Galasso, V., Profeta, P., 2002. The political economy of social security: a survey. Eur. J. Polit. Econ. 18 (1), 1–29.
Galasso, V., Profeta, P., 2011. When the State Mirrors the Family: The Design of Pension Systems. CEPR Discussion Papers 8723. C.E.P.R. Available at SSRN: http://ssrn.com/abstract=1976064.
Giuliano, P., Spilimbergo, A., Tonon, G., 2014. Genetic distance, transportation costs, and trade. J. Econ. Geogr. 14 (1), 179–198.
Hempel, P.S., 1998. Designing multinational benefits programs: the role of national culture. J. World Bus. 33 (3), 277–294.
Hofstede, G., 2001. Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations, 2nd ed. Sage Publications, Beverly Hills.
Hofstede, G., Hofstede, G.J., Minkov, M., 2010. Cultures and Organizations: Software of the Mind, 3rd ed. McGraw-Hill, USA.
Iversen, T., Soskice, D., 2001. An asset theory of social policy preferences. Am. Polit. Sci. Rev. 95 (4), 875–894.
Kashima, E.S., Kashima, Y., 1998. Culture and language: the case of cultural dimensions and personal pronoun use. J. Cross-Cult. Psychol. 29 (3), 461–487.
Kirkman, B.L., Lowe, K.B., Gibson, C.B., 2006. A quarter century of culture's consequences: a review of empirical research incorporating Hofstede's cultural values framework. J. Int. Bus. Stud. 37 (3), 285–320.
Krieger, T., Traub, S., 2008. Back to Bismarck? Shifting Preferences for Intragenerational Redistribution in OECD Pension Systems. Working Paper Series 13. Center for International Economics.
Krieger, T., Traub, S., 2011. Wie Hat Sich Die Intragenerationale Umverteilung in Der Staatlichen Säule Des Rentensystems Verändert? Ein Internationaler Vergleich Auf Basis Von LIS-Daten/Has intragenerational redistribution become less important in pension systems' public pillar? An international comparison based on LIS microdata. Jahrb. Natl. Stat./J. Econ. Stat. 231 (2), 266–287.
Krieger, T., Traub, S., 2013. The Bismarckian factor – a measure of intragenerational redistribution in international pension systems. CESifo DICE Rep. 11 (1), 64–66.
Kwok, C.C., Tadesse, S., 2006. National culture and financial systems. J. Int. Bus. Stud. 37 (2), 227–247.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, Robert, 1999. The quality of government. J. Law Econ. Organ. 15 (1), 222–279.
Letendre, K., Fincher, C.L., Thornhill, R., 2010. Does infectious disease cause global variation in the frequency of intrastate armed conflict and civil war? Biol. Rev. 85 (3), 669–683.
Licht, A.N., Goldschmidt, C., Schwartz, S.H., 2007. Culture rules: the foundations of the rule of law and other norms of governance. J. Comp. Econ. 35 (4), 659–688.
Lindbeck, A., Persson, M., 2003 g. ains from pension reform. J. Econ. Lit. 41 (1), 74–112.
Lindert, P.H., 1994. The rise of social spending, 1880–1930. Explor. Econ. Hist. 31 (1), 1–37.
Luttmer, E.F., 2001. Group loyalty and the taste for redistribution. J. Polit. Econ. 109 (3), 500–528.
Maddison, A., 1991. Dynamic Forces in Capitalist Development: A Long-Run Comparative View, vol. 2. Oxford University Press, Oxford.
Mitchell, B.R., 1992. International Historical Statistics: Europe, 1750–1988, 3rd ed. Stockton Press, New York.
Organization for Economic Co-operation and Development (OECD), 2011. Pensions At a Glance 2011: Retirement-Income Systems in OECD and G20 Countries. OECD, Paris http://dx.doi.org/10.1787/pension_glance-2011-en.
Perotti, E., Schwienbacher, A., 2009. The political origin of pension funding. J. Financ. Intermed. 18 (3), 384–404.

Queisser, M., Whitehouse, E., Whiteford, P., 2007. The public–private pension mix in OECD countries. Ind. Relat. J. 38 (6), 542–568.
Rehm, P., 2005. Citizen Support for the Welfare State: Determinants of Preferences for Income Redistribution. Discussion Paper No. SP II 2005-02. Wissenschaftszentrum Berlin für Sozialforschung, Forschungsschwerpunkt Markt und Politische Ökonomie, Arbeitsgruppe Institutionen, Staaten, Märkte Available at: http://hdl.handle.net/10419/51219.
Reuter, C., 2011. A survey of culture and finance. Financ: Rev. Assoc. Fr. Financ. 32 (1), 76–152.
Rivera-Rozo, J.A., Steenbeek, O.W., Van der Lecq, S.G., 2014. An empirical exploration of structural and cultural factors associated with pension systems. In: Van Oorschot, W., Peeters, H., Boos, K. (Eds.), Invisible Social Security Revisited: Essays in Honour of Jos Berghman. Lannoo Publishers, Leuven, pp. 267–288.
Shao, L., Kwok, C.C., Zhang, R., 2013. National culture and corporate investment. J. Int. Bus. Stud. 44 (7), 745–763.
Spolaore, E., Wacziarg, R., 2009. The diffusion of development. Q. J. Econ. 124 (2), 469–529.
Stone, L., Lurquin, P.F., Cavalli-Sforza, L.L., 2006. Genes, Culture, and Human Evolution: A Synthesis. Wiley-Blackwell, Malden, MA.
Tang, L., Koveos, P.E., 2008. A framework to update Hofstede's cultural value indices: economic dynamics and institutional stability. J. Int. Bus. Stud. 39 (6), 1045–1063.
Tausch, F., Potters, J.P., Riedl, A., 2013. Preferences for redistribution. What can we learn from experiments? J. Pension Econ. Financ. 12 (3), 298–325.
Taylor, B., 2002. Could this decade be the next 1930s? A review of world stock markets in the 1920s. Available at: https://www.globalfinancialdata.com/News/Articles/Could_This_Decade_Be_The_Next_1930.pdf.
Williamson, O.E., 2000. The new institutional economics: Taking stock, looking ahead. J. Econ. Lit. 38 (3), 595–613.